from the figures and inscriptions which they bore, and when in medieval times the art of gem-engraving was lost, the gems were still made serviceable by the representations of Greek deities being regarded as those of Christian saints, liturgies being composed by means of which—the old love of ornament and mysticism remaining—the heathen relics were reconsecrated for Christian use.

Of the persistence to recent periods, and even to our own day, of fanciful and superstitious beliefs concerning precious stones, Dr. Kunz gives many amusing illustrations. In a book published in Frankfort as late as 1718, an "airship" is represented which is raised by the supposed action of sunlight upon the "coral-agates" in its roof, a "magnetic action" being thus produced! Napoleon, when in Egypt, found a carnelian seal engraved with Arabic characters, which he wore as a talisman until his death, and it was equally treasured and carried at all times by Napoleon III. The ill-fated Prince Imperial had it on his person in South Africa, and it appears to have been carried off by the Zulus who stripped his body. It is asserted that a well-known noble lady, still living, believes that her diamonds not only have life and sex, but are capable of reproduction; while a recent trial in Paris showed that a wealthy lady became suddenly so overcome by fear of the evil influences of an opal-ring she wore that she slipped it off and put it on the finger of a poor girl who was passing. It is declared that a well-known authoress confesses that she habitually resorts to "crystal-gazing" to recover the thread of a story that she has temporarily lost.

Many very interesting extracts are given by Dr. Kunz from curious and little-known works, which illustrate alike the wildly absurd views held in all ages concerning the various influences exercised by different precious stones on those who wear them, and the cures and other wonders wrought by them, these ideas prevailing not only among the poor and ignorant, but among the educated of all classes and religions. The book, which is admirably illustrated, is as entertaining as it is instructive. J. W. J.

ANIMAL MORPHOLOGY AND EMBRYOLOGY.

(1) *A Text-book of General Embryology.* By Prof. W. E. Kellicott. Pp. v+376. (New York: Henry Holt and Co., 1913.) Price 2.50 dollars.

(2) *Zellen- und Gewebelehre Morphologie und Entwicklungsgeschichte.* Unter Redaktion von E. Strasburger und O. Hertwig. Bearbeitet von E. Strasburger, W. Benecke, R. Hertwig, and others. I. Botanischer Teil. Unter Redaktion von E. Strasburger. Bearbeitet von E. Strasburger und W. Benecke. Pp. vii+338. Price 10 marks. II. Zoologischer Teil. Unter Redaktion von O. Hertwig. Bearbeitet von R. Hertwig, H. Poll, O. Hertwig, and others. Pp. vii+538. (Berlin and Leipzig: B. G. Teubner, 1913.) Price 16 marks.

(3) *Elementares Praktikum der Entwicklungsgeschichte der Wirbeltiere mit Einführung in die Entwicklungsmechanik.* By Dr. Oscar Levy. Pp. viii+183. (Berlin: Gebrüder Borntraeger, 1913.) Price 5.60 marks.

(1) THIS is an excellent book to place in the hands of intermediate students of zoology; it gives a clear and interesting account of the more general aspects of embryological science. If the hypercritical reader regards it as somewhat scrappy and superficial, it must be answered that this is unavoidable in a book of its size dealing with so large a subject. The book does not pose as a work of reference; its function rather appears to be to give the student an idea of the present-day point of view of biologists towards the various problems of which it treats, to arouse his interest, and to direct his steps towards the fuller expositions to be found in contemporary literature.

An introductory chapter upon ontogeny is followed by excellent chapters on the cell and cell-division, the germ cells, and the process of maturation or meiosis. In regard to the last-mentioned phenomenon a very good and clear account of modern views is given. A few obvious slips will, no doubt, be corrected in a new edition, *e.g.*, in the legend attached to Agar's figure illustrating the spermatogenesis of Lepidosiren the last six words convey an erroneous statement, and should be excised. Again, in the description of tetrad formation the student will be liable to be puzzled, if not misled, by the wording of the statement that "each of the newly-organised bivalent elements comes out in the form of four small bodies, the tetrads." He may find himself in a similar position when he reads that in cases where tetrad formation takes place "the secondary spermatocytes have the diploid number." Good accounts are given of fertilisation, and of the general features of segmentation, including "cell-lineage," and these are followed by an excellent chapter on the differentiation of the embryo, heredity, and sex determination. In this chapter we welcome particularly the short and clear and critical account of the hypothesis of "organ-forming substances," which will act as a useful corrective to the somewhat prevalent teaching of this hypothesis by uncritical teachers as a well-established theory. As the author puts it, the localised distribution of substances in the egg, upon which this hypothesis is based, is to be regarded rather as a process or result of development than as a primary determining factor of the course of development. A good account is given of the idiochromosome and its relation to sex, and the book ends with a chapter on blastula, gastrula, and germ-layers.

The book is excellently written, and clearly illustrated; it fills an obvious gap in the teaching literature of zoology, and it deserves to have a wide circulation amongst students of that science.

(2) The two biological volumes here under discussion fully maintain the high standard of the great series of volumes entitled "Die Kultur der Gegenwart." The botanical volume is composed of an excellent section on plant histology from the pen of the late Prof. Strasburger, followed by one on plant morphology and development by Benecke.

The zoological volume forms an interesting text-book which will be of use to the senior student as a help towards getting a grip of the current views regarding some of the more important problems of morphology. The volume opens with a charming essay by Richard Hertwig upon unicellular organisms, which gives an excellent sketch of present-day ideas, together with valuable indications regarding future work. Hertwig's essay is followed by a useful sketch of modern histology by Poll, and this in turn by an admirable chapter by Oscar Hertwig on general and experimental morphology and embryology. This commences with a masterly account of the main features of gametogeny and fertilisation—one of the most interesting sections being that in which is given an account of recent experiments in which gametes or zygotes have been subjected to the influence of such substances as radium and mesothorium. An excellent chapter is devoted to parthenogenesis, and the suggestion is brushed aside with scant ceremony that the production of parthenogenesis by artificial means—whether chemical or mechanical—gives any clue whatever to the ultimate nature of the fertilisation process. A witty paragraph is quoted from Bolzmann as to Loeb's work and the exaggerated claims based upon it. How important was the discovery that a process believed to be so essentially vital in its nature was merely chemical! What important consequences the discovery might have when future developments rendered possible its application to the human race—the emancipation of woman to a degree undreamt of by the greatest enthusiast for women's rights! The mere man becomes superfluous; he is replaced by a flask of chemical solution; sex-determination by chemical means follows, and males, now mere useless curiosities, are produced only as occasional specimens for zoological gardens!

A general description is given of the processes of segmentation and gastrulation, and the chapter concludes with a short sketch of the chief results of experimental embryology.

About 150 pages are occupied by a really admirable account by Heider of the morphology of the invertebrate metazoa. It is most clearly and interestingly written, and is illustrated by excellent figures. Naturally, views are occasionally expressed to which some may take exception, but, on the whole, we know of no better general account of the morphology of invertebrates. The subject-matter of the chapter is rightly termed morphology rather than comparative anatomy, confining itself as it does to really important features and ignoring those masses of unimportant detail that so usually make a modern text-book of zoology an effective stifler of all interest in the subject. We notice very few slips. The familiar German misuse of the word splanchnopleure when splanchnic mesoderm is meant catches the eye of the English reader. The frequent reference made to the trochosphere type of larva as an evidence of phylogenetic affinity will not altogether appeal to those who suspect the various larvæ of this type of being simply convergent adaptations to a pelagic existence, while some morphologists of the Cambridge school will look askance at the not unfamiliar attitude towards the primitive and ancestral nature of the lower platyhelminths. But the general opinion will be that Heider has produced a very admirable sketch of his subject.

The remaining two chapters—on vertebrate embryology by Keibel and on vertebrate morphology by Gaupp—are less satisfactory. It seems an error in planning the book to have two such separate chapters, as there can be no morphology worth the name without embryology, and no embryology worth the name without morphology. We are glad to see that Keibel is not overawed by the sanctity of that—in some respects—most highly specialised vertebrate Amphioxus, and that he takes the common-sensible position in regard to the greatly degenerate character of its head region, though we fail to follow him in his somewhat derogatory remarks regarding its gastrulation processes. It seems, by the way, regrettable that Keibel, like many others who are specially interested in the embryology of the higher vertebrates, uses the word gastrulation in a sense which does not seem to be justified. Strictly speaking, the term gastrulation should only be used of forms in which an undoubted gastrula has been shown to be present; to use it in reference to the two-layered condition of a bird or mammal in which there is the greatest reason to doubt that a true gastrula stage exists at all, is simply to court confusion, and leads to such absurdities as the statement that "endoderm," or "ectoderm," is not homologous throughout the series of vertebrates. To give a cell-layer, the name endoderm in the various types of vertebrates is, of course, merely a short way of stating that it *is* homologous in these various types!

(3) Dr. Levy's book affords a short sketch of vertebrate embryology written from a practical point of view. Simple instructions as to laboratory methods are given, stress being very properly laid on the preparation of thick, free-hand sections of embryos—the great instructiveness of which is too often ignored. The chapter on technique is followed by an account of gametes and gametogenesis, then by chapters on early development in amphibia and in the chick, while the remaining half of the book is devoted to organogeny and a short chapter on developmental mechanics.

OUR BOOKSHELF.

The Change in the Climate and its Cause. By Major R. A. Marriott. Pp. 94. (London: E. Marlborough and Co., n.d.) Price 1*s.* 6*d.*; cloth 2*s.* 6*d.*

This book is a contribution to the great Drayson Myth, and as such it may appeal to those with whom it is a fair presumption that any theory of orthodox science is wrong, and also to those who take a curious interest in the vagaries of that class of mind.

Major Marriott, like Sir A. de Horsey in "Draysonia," complains that Drayson was not taken seriously. The fact is perfectly true, but the complaint is unjust precisely because General Drayson (not without professional precedents) failed to take seriously the position he was assailing. Astronomy is unique among sciences in its dependence on a single controlling principle, gravitation. It is open to anybody to abolish that principle and coordinate the facts otherwise—if he can. Or he may question the accuracy in detail of a mathematical deduction or demonstrate a false assumption. What he cannot do is to isolate a piece of the whole doctrine, reject the operation of the general law in the particular case on insufficient grounds, and ignore the effect of what he is doing on the whole related theory.

It would be unprofitable to comment on the errors (as we deem them) of the present work. It is pleasanter to mention the one pertinent remark which we have come across. This is the reference to the theory of "planetary inversion" (p. 66). It is quite possible that tidal friction is slowly changing the obliquity of the ecliptic, and thus exercising a secular influence on climate. But the effect is very slow; it is not periodic; and there is little in common between the methods of Mr. Stratton and those of General Drayson and his followers.

The book deals largely with changing climatic conditions, the evidence of geology, and the bearing of the so-called astronomical theory of an ice age. But why are the possibilities limited by the tacit assumption that the radiation of the sun has been constant through geological ages, an assumption not merely unproved, but even improbable? H. C. P.

Perspective made Easy by Means of Stereoscopic Diagrams. By C. E. Benham. (Colchester: C. E. Benham, 28 Wellesley Road.) Price (post free) 6*s.* 2*d.*

This set of fifteen stereograms is intended as a substitute for models as used by teachers and students in illustration of some of the rules and principles of perspective projection. When viewed in a stereoscope the diagrams exhibit in relief, amongst other things, the principle of the convergence or parallelism of the projections of parallel lines in space; and the rotation into the picture plane of horizontal and vertical vanishing planes, thus illuminating the constructions relating to vanishing and measuring points for horizontal and inclined lines. An explanation is given in a sixteen-page pamphlet which accompanies the stereograms.

The idea of the author is good, but it is not very efficiently carried out. The views are not always so convincing as they might be, and the descriptions are occasionally lacking in mathematical precision. We also think that the price has been fixed too high. Nevertheless, a teacher would receive some useful suggestions by a study of the diagrams.

A Laboratory Manual of Organic Chemistry for Beginners. By Prof. A. F. Holleman. Edited by Dr. A. J. Walker. Second edition, partly re-written. Pp. xvii+83. (New York: John Wiley and Sons; London: Chapman and Hall, Ltd., 1913.) Price 4*s.* 6*d.* net.

A review of the first edition of Dr. Walker's translation of Prof. Holleman's little book appeared in the issue of Nature for May 11, 1905 (vol. lxxii., p. 28). New experiments have been incorporated in the present edition, and some obsolete reactions have been omitted.

Engineering Workshop Exercises. By Ernest Pull. Pp. viii+80. (London: Whittaker and Co., 1914.) Price 2*s.* net.

This little book provides instructions to enable technical students and apprentice engineers to perform their workshop experiments and exercises intelligently, and to obtain practice in the use of ordinary engineering tools and appliances. Prominence is given to the value of working drawings, and accuracy is insisted upon consistently. A chapter on screw-cutting and notes on materials are included in the book.